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NOTES ON GEOGRAPHIC DISTRIBUTION

Platyhelminthes, Trematoda, Digenea Carus, 1863: Distribution extension in Argentina and new Anura and Ophidia hosts

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ABSTRACT: The aim of this paper is to increase the knowledge on the diversity of digenean parasites in ophidians and anurans from northeastern Argentina. Specimens of the snakes *Eunectes notaeus*, *Hydrodynastes gigas*, *Micrurus corallinus*, *Philodryas* sp. and *Sibynomorphus* sp., and the anurans *Rhinella schneideri*, *Phyllomedusa azurea* and *Leptodactylus latrans* were examined. Twelve digenean species were identified: *Catadiscus corderoi* Mañé-Garzón, 1958, *Catadiscus dolichocotyle* (Cohn, 1903), *Catadiscus uruguayensis* Freitas & Lent, 1939, *Choledocystus elegans* (Travassos, 1926), *Gorgoderina parvicava* Travassos, 1922, *Haplometroides buccicola* Odhner, 1911, *Heterodiplostomum lanceolatum* Dubois, 1936, *Infidum similis* Travassos, 1916, *Mesocoelium monas* (Rudolphi, 1819), *Plagiorchis luehei* (Travassos, 1927), *Telorchis clava* (Diesing, 1850) and *Travtrema stenocotyle* (Cohn, 1902). New host species and/or new locality records from Argentina are presented.

The available information on the digeneans of Argentinean reptiles and anurans is scarce; 313 reptile species were reported in this country, but only 50 species (16 %) have been studied for digeneans; whereas only 12 (7 %) of the 171 Argentinean amphibian species were reported as host of adult digeneans (Lunaschi and Drago 2007). In this paper, we analyze samples from frogs, toads, and snakes captured in natural ecosystems impacted by deforestation and rural activities in the northeastern of Argentina.

The investigation was based on the study of the digeneans collected between March 1997 and March 2002 in different localities of Misiones, Chaco, Corrientes and Formosa Provinces, Argentina (Figure 1). The ophidians examined were: *Hydrodynastes gigas* (Duméril) (n = 1), *Philodryas* sp. (n = 1), *Sibynomorphus* sp. (n = 1), (Dipsadidae); *Eunectes notaeus* Cope (n = 1) (Boidae), and *Micrurus corallinus* (Merrem) (n = 1) (Elapidae). The anurans studied were: *Rhinella schneideri* (Werner) (n = 2) (Bufonidae), *Phyllomedusa azurea* Cope (n = 17) (Hylidae), and *Leptodactylus latrans* (Steffen) (n = 10) (Leptodactylidae). The digenean specimens were fixed in hot formalin, preserved in 70 % ethanol, flattened and stained with a 1:6 96° ethanol dilution of hydrochloric carmine, dehydrated and mounted in Canada balsam. The specimens were deposited in the Helminthological Collections of Museo de La Plata (MLP), La Plata, Argentina. The taxonomy of digeneans follows Gibson *et al.* (2002), Jones *et al.* (2005) and Bray *et al.* (2008). The taxonomy of host follows Lavilla *et al.* (2010), Caramaschi (2006), Chaparro *et al.* (2007) and Zaher *et al.* (2009).

SUBCLASS DIGENEA Carus, 1863

SUPERFAMILY DIPLOSTOMOIDEA Poirier, 1886

Family Proterodiplostomidae Dubois, 1936

Genus *Heterodiplostomum* Dubois, 1936

Heterodiplostomum lanceolatum Dubois, 1936.
Host: South American water cobra, *Hydrodynastes gigas* (Duméril) (Serpentes, Dipsadidae).
Locality and date: El Colorado (26°18' S, 59°22' W), Department Pirané, Formosa Province, September 15, 2001.
Site of infection: large intestine.
Prevalence and intensity of infection: 1 of 1; 2.
Material deposited: 2 specimens MLP 5504.
Comments: This species was found in Argentina parasitizing *H. gigas* from Corrientes Province; *Bothrops alternatus* Duméril, Bibron & Duméril (Viperidae) from Santiago del Estero, Corrientes and Santa Fé Provinces; *Helicops leopardinus* (Schlegel) (Dipsadidae) from Chaco and Corrientes Provinces (Caubisens Poumarau 1968); and *Helicops infrataeniatus* Jan (Dipsadidae) from Buenos Aires (Lunaschi and Sutton 1985). This finding represents a new geographical record.

SUPERFAMILY GORGODEROIDEA Looss, 1899.

Family Dicrocoeliidae Looss, 1899

Genus *Infidum* Travassos, 1916

Infidum similis Travassos, 1916.
Host: *Philodryas* sp. (Serpentes, Dipsadidae).
Locality and date: La Marcela farm (26°17'35" S, 59°06'67" W), Department Pirané, Formosa Province; September 17, 2001.
Site of infection: gall bladder.
Prevalence and intensity of infection: 1 of 1; 2.
Material deposited: 2 specimens MLP 5516.
Comments: This species was reported in Argentina by

Caubisens Poumarau (1968) parasitizing the gall bladder of *Philodryas olfersii* Boulenger (Dipsadidae) from Padre Lozano, Salta Province. New geographical record.

Family Gorgoderidae Looss, 1899

Genus *Gorgoderina* Looss, 1902

Gorgoderina parvicava Travassos, 1922.
Host: creole frog, *Leptodactylus latrans* (Steffen) (Amphibia, Leptodactylidae).
Locality: Cuñá Pirú stream, Cainguás, Misiones Province (27°05'14" S, 54°57'11" W), July 23, 1998.
Site of infection: intestine.
Prevalence and intensity of infection: 10 % (1 of 10); 1.
Material deposited: 1 specimen MLP 5461.
Comments: Previous records of this species in Argentina include *L. latrans* from Buenos Aires Province (Suriano 1965; 1970). New geographical record.

Family Mesocoeliidae Dollfus, 1929

Genus *Mesocoelium* Odhner, 1910

Mesocoelium monas (Rudolphi, 1819) Freitas, 1958.
Hosts, localities and dates: rococo toad, *Rhinella schneideri* (Werner) (Amphibia, Bufonidae), Corrientes City (27°29' S, 58°49' W), March 19, 2002, and *Sibynomorphus* sp. (Serpentes, Dipsadidae), El Sombrerito stream, Corrientes Province (27°38' S, 58°44' W), March 20, 2002.
Site of infection: intestine.
Prevalence and intensity of infection: *R. schneideri* 50 % (1 of 2), 12; *Sibynomorphus* sp. 1 of 1, 13.
Material deposited: *R. schneideri*: 12 specimens MLP 5509; *Sibynomorphus* sp.: 13 specimens MLP 5512.
Comments: This species was reported in Argentina parasitizing the intestine of three species of snakes: *Sibynomorphus ventrimaculatus* (Boulenger) from Misiones and Chaco Provinces, *Sibynomorphus turgidus* (Cope) from Misiones and Entre Ríos Provinces, and *Tomodon ocellatus* Duméril, Bibron & Duméril (Serpentes, Dipsadidae) from Buenos Aires Province (Caubisens Poumarau 1968). New host and new geographical record.

Superfamily Paramphistomoidea Fischoeder, 1901

Family Diplodiscidae Cohn, 1904

Genus *Catadiscus* Cohn, 1904

Catadiscus corderoi Mañé-Garzón, 1958
Host: creole frog, *Leptodactylus latrans* (Steffen) (Amphibia, Leptodactylidae).
Locality and date: Cuñá Pirú stream, Cainguás, Misiones Province (27°05'14" S, 54°57'11" W), July 23, 1998.
Site of infection: intestine.
Prevalence and intensity of infection: 10 % (1 of 10); 6.
Material deposited: 6 specimens MLP 5460.
Comments: At present, this species has only been reported parasitizing *P. minutus* as *P. meridionalis* Miranda-Ribeiro) (Amphibia, Pseudidae) from Uruguay (Mañé-Garzón 1958). New host and new geographical record.

Catadiscus dolichocotyle (Cohn, 1903) Cohn, 1904
Host: *Philodryas* sp. (Serpentes, Dipsadidae).
Locality and date: La Marcela farm (26°17'35" S, 59°06'67" W), Department Pirané, Formosa Province; September 17, 2001.
Site of infection: large intestine.
Prevalence and intensity of infection: 1 of 1; 4.
Material deposited: 4 specimens MLP 5515.
Comments: At present, this species has been reported parasitizing *Chironius fuscus* (L.) (Serpentes, Colubridae) from Brazil and *Liophis miliaris* (L.) (Serpentes, Dipsadidae) from Uruguay (Travassos *et al.* 1969, Mañé-Garzón and Gortari 1965). This finding represents the first record of *C. dolichocotyle* in Argentina in a new host species.

Catadiscus uruguayensis Freitas & Lent, 1939
Host: orange-legged monkey frog, *Phyllomedusa azurea* (Cope) (Amphibia, Hylidae).
Locality and date: Resistencia (27°27'06" S, 58°59'10" W), Chaco Province; March 23, 1997.
Site of infection: stomach, large intestine.
Prevalence and mean intensity: 29 % (5 of 17); 7.
Material deposited: 36 specimens MLP 3761B, 3761C, 3763 C, 3767C, 3769C, 3770C.
Comments: Previous records of this species in amphibians and reptiles of Argentina are restricted to the Province of Buenos Aires; as amphibian parasite, *C. uruguayensis* has been reported by Suriano (1970) in adults of *L. latrans* and by Ostrowski de Núñez (1979) in tadpoles of *Hypsiboas pulchellus* (Duméril & Bibron) (as *Hyla pulchela*) (Amphibia, Hylidae) and adults of *L. latrans* and *Pseudis minutus* Günther (Amphibia, Pseudidae) [as *Lysapsus mantidactylus* (Cope)]. In reptiles, this digenean species has been reported by Lunaschi and Drago (2002) parasitizing *Liophis poecilogyrus* (Wied) (Dipsadidae). New host and new geographical record.

Superfamily Plagiorchioidea Lühe, 1901

Family Plagiorchiidae Lühe, 1901

Genus *Choledocystus* Pereira & Cuocolo, 1941

Choledocystus elegans (Travassos, 1926) Ruiz 1949
Host: Creole frog, *Leptodactylus latrans* (Steffen) (Amphibia, Leptodactylidae).
Locality: Cuñá Pirú stream, Cainguás, Misiones Province (27°05'14" S, 54°57'11" W), July 23, 1998.
Site of infection: intestine, pancreas.
Prevalence and intensity of infection: 10 % (1 of 10); 22
Material deposited: 22 specimens MLP 5459.
Comments: This species has been reported parasitizing *L. latrans*, *Rhinella marina* (L.) [as *Bufo marinus* (L.)] (Bufonidae) and *Leptodactylus pentadactylus* (Cope) (as *L. pentadactylus labyrinthicus* Spix) (Leptodactylidae) from Brazil (Ruiz 1949; Travassos *et al.* 1969; Noronha *et*

al. 2009). This finding represents the first record of this species in Argentina.

Genus *Haplometroides* Odhner, 1910

Haplometroides buccicola Odhner, 1911
Host: coral snake, *Micrurus corallinus* (Merrem) (Serpentes, Elapidae).
Locality and date: Cuñá Pirú stream, Cainguás, Misiones Province (27°05'14" S, 54°57'11" W), March 15, 2000.
Site of infection: esophagus.
Prevalence and intensity of infection: 1 of 1; 1
Material deposited: 1 specimen MLP 5505.
Comments: Caubisens Poumarau (1968) reported this digenean species parasitizing the lung of the southern coral snake, *Micrurus frontalis* (Duméril, Bibron & Duméril) (Elapidae) from Puerto Esperanza, Misiones, Argentina. New host and new geographical record.

Genus *Plagiorchis* Lühe, 1899

Plagiorchis luehei Travassos, 1927
Host: South American water cobra, *Hydrodynastes gigas* (Duméril) (Serpentes, Dipsadidae).
Locality and date: El Colorado (26°18' S, 59°22' W), Department Pirané, Formosa. Province, September 15, 2001.
Site of infection: mouth, esophagus.
Prevalence and intensity of infection: 1 of 1; 13.
Material deposited: 13 specimens MLP 5501, MLP 5502.
Comments: *P. luehei* (cited as *Microderma luehei* Travassos, 1927) was found in Argentina parasitizing *H. gigas* (as *Cyclagras gigas* Cope) from natural ecosystems from Corrientes and Chaco Provinces (Caubisens Poumarau 1968; Martínez *et al.* 1996). Later, it was reported in the same host from La Plata Zoological Garden, Buenos Aires Province (Lunaschi and Sutton 1985). New geographical record.

Genus *Travtrema* Pereira, 1929

Travtrema stenocotyle (Cohn, 1902)
Host: *Philodryas* sp. (Serpentes, Dipsadidae).
Locality and date: La Marcela farm (26°17'35" S, 59°06'67" W), Department Pirané, Formosa Province; September 17, 2001.
Site of infection: esophagus, cloaca.
Prevalence and intensity of infection: 1 of 1; 12.
Material deposited: 12 specimens MLP 5499, MLP 5500.
Comments: Geographical distribution of this species in Argentine includes Buenos Aires, Corrientes, Chaco, Córdoba, Entre Ríos, La Rioja, Misiones, San Luis, Santa Fé, Santiago del Estero and Tucumán Provinces, parasitizing a large variety of dipsadid snakes: *Clelia rustica* (Cope), *Liophis flavifrenatus* (Cope), *Liophis miliaris semiaureus* (Cope), *Liophis jaegeri* (Günther), *L. poecilogyrus*, *Philodryas patagoniensis* (Girard), *S. ventrimaculatus*, *Thamnodynastes pallidus* L., *Xenodon dorbignyi* Duméril, Bibron & Duméril, *Xenodon merremi* (Wagler), and viperid snakes, *B. alternatus* and *Bothrops neuwedii diporus* Cope (Lunaschi and Drago 2007). New geographical record.

Family Telorchiidae Looss, 1899

Genus *Telorchis* Lühe, 1899

Telorchis clava (Diesing, 1850)
Host: yellow anaconda, *Eunectes notaeus* Cope (Serpentes, Boidae).
Locality and date: La Marcela farm (26°17'35" S, 59°06'67" W), Department Pirané, Formosa Province; September 17, 2001.
Site of infection: small intestine.
Prevalence and intensity of infection: 1 of 1; 7.
Material deposited: 7 specimens MLP 5511.
Comments: Previous records of *T. clava* in Argentinean reptiles include *E. notaeus* from Chaco (Caubisens Poumarau 1968), and to *H. gigas* from Corrientes (Martínez *et al.* 1996). New geographical record.

FIGURE 1. Map of northeastern Argentina showing the localities sampled: 1) El Colorado; 2) La Marcela farm; 3) Resistencia; 4) El Sombrerito stream; 5) Corrientes City; 6) Cuñá Pirú stream.

In this work, we extend the geographical distribution of 12 digenean species: *C. corderoi*, *C. dolichocotyle*, *C. uruguayensis*, *Ch. elegans*, *G. parvicava*, *H. buccicola*, *H. lanceolatum*, *I. similis*, *M. monas*, *P. luehei*, *T. clava* and *T. stenocotyle*. Three of them are reported for the first time in Argentina: *C. dolichocotyle* previously recorded only in Uruguay and Brazil, *C. corderoi* only reported in Uruguay, and *Ch. elegans* only registered in Brazil.

Three anuran species, *R. schneideri*, *L. latrans* and *P. azurea* are reported as new hosts of *M. monas*, *C. corderoi* and *C. uruguayensis*, respectively. Two ophidian species, *M. corallinus* and *Philodryas* sp. are presented as new hosts of *H. buccicola* and *C. dolichocotyle*, respectively.

Finally, two amphibian species (*R. schneideri* and *P. azurea*), and one snake species (*M. corallinus*) are reported for the first time as digenean hosts in Argentina. These results highlight the need for further investigation and research on both groups of vertebrates.

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